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Unclogging the Data-Center Power Drain

Technology Executives, Federal Officials Join Forces to Study Ways to Lower Energy Costs

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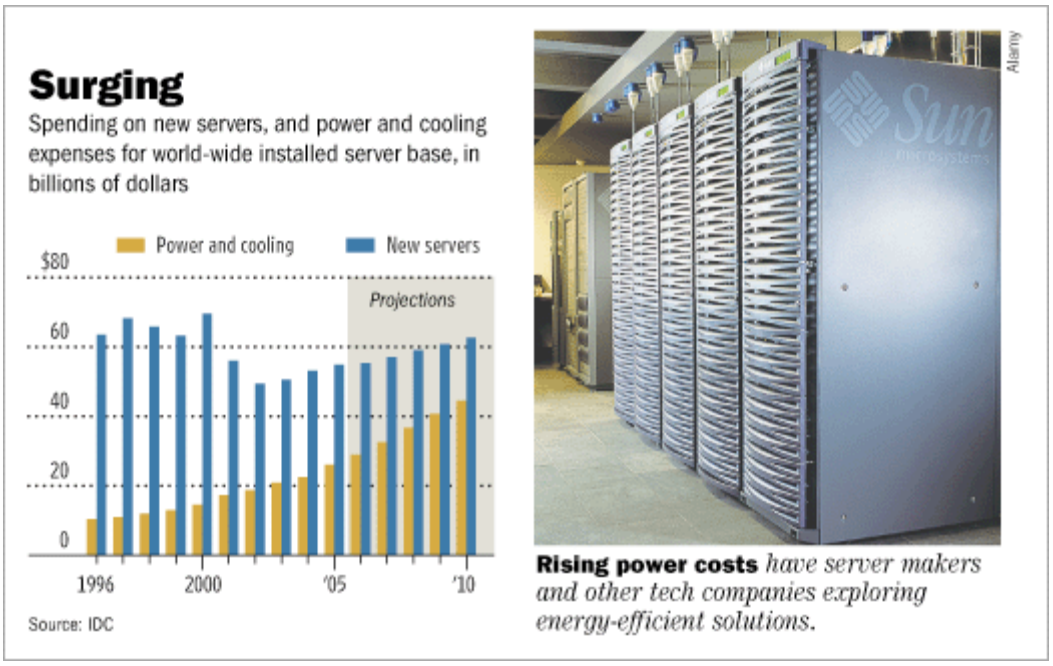
SUNNYVALE, Calif. -- Archrivals **Intel** Corp. and **Advanced Micro Devices** Inc. don't agree on many things. But on one subject, officials from the two chip makers are in accord: the need to rein in the soaring power appetite of computer data centers that rely on their technology.

That executives from the two companies were willing to gather in the same room to discuss the problem -- in the offices of AMD, much less -- was a tribute to an unlikely new player on the Silicon Valley scene: the federal government.

Andy Karsner, an assistant secretary of the Department of Energy, led a recent roundtable of technology executives at AMD's corporate campus here to explore ways their companies and federal officials could collaborate to bring down runaway power costs in computer rooms. Other rivals at the meeting included officials from software powerhouses **Microsoft** Corp. and **Oracle** Corp., and hardware titans **Hewlett-Packard** Co. and **Dell** Inc.

"Like going into a Klingon ship," is how William Swope, a veteran Intel manager, later described the experience of entering the AMD camp.

The Environmental Protection Agency also has engaged Silicon Valley on ways to reduce the power drain of server systems, the powerful computers that account for most power consumption in data centers. Over the past year, EPA officials have convened two meetings of computer companies to evaluate ways data servers can be designed to consume less power.



Rising power costs *have server makers and other tech companies exploring energy-efficient solutions.*

In a sign of bipartisan political interest in the issue, Congress this month passed a bill that directs the EPA to study and promote the use of energy-efficient servers. The EPA and DOE previously have been active in promoting energy efficiency in other electronics, such as refrigerators and washing machines.

Many Silicon Valley executives -- who in the past often have been wary of federal meddling in their industry -- are embracing the government's involvement because they say it will help put more resources into solving the problem.

"I think it's about time that industry and government started working together," says Pamela Gordon, president of Technology Forecasters, a research and consulting firm in Alameda, Calif.

Partly to keep up with the Internet's surging growth, companies have been filling up rack after rack with low-end servers that use chips from Intel or AMD. The number of servers has doubled to about 28 million world-wide from about 14 million in 2000, according to estimates by Jed Scaramella, an analyst at IDC, a research firm based in Framingham, Mass. Their power usage -- much of it to keep the machines cool -- has also soared to 400 watts per server on average from about 250 six years ago, Mr. Scaramella says.

With energy rates also rising, companies have tried to save power where they can. Both Microsoft and **Yahoo** Inc., for example, are putting server farms in eastern Washington state, near less-costly hydroelectric power supplies. **Google** Inc. has put a data center near hydro supplies in Oregon.

Overall, power consumption now accounts for 40% of a data center's operating budget, estimates Paul Perez, a vice president of technology solutions at H-P. "Some of these power problems have been dirty laundry that people don't want to talk about," he says.

AMD and Intel are trying to tackle the problem, in part by offering server chips that operate at lower frequencies and draw less power. Their customers -- including H-P, Dell, **Sun Microsystems** Inc. and **International Business Machines** Corp. -- have been making technology improvements of their own, including ways to cool systems while using less electricity.

Industry-government collaboration on the problem kicked into a high gear after a meeting last January between the EPA and 200 high-tech executives at Sun's headquarters in Santa Clara, Calif., recalls David Douglas, a vice president in charge of environmental affairs at Sun.

Besides pressing for energy-efficient servers through its own purchases, the federal government could help raise awareness of the need to redesign other components in the data center, such as power supplies and air-conditioning units, says Jonathan Koomey, a staff scientist at the Lawrence Berkeley National Laboratory in Berkeley, Calif. "In the data center, there are dozens of companies whose products are represented, Mr. Koomey says.

Lack of agreement on how to measure energy usage in servers has been a hurdle. "As an industry, we have collaborated and defined benchmarks to measure performance, but nobody said, 'How do you measure power,' " says Sun's Mr. Douglas.

Coming up with a benchmark standard to measure energy usage has been a top priority in the EPA's endeavors in Silicon Valley. Following an initial get-together, EPA officials say they convened a smaller technical meeting in San Francisco in February to hone energy-measuring specifications. Industry executives say a standard is likely to come about over the next year.

Meanwhile, the DOE, which has some of the nation's top energy scientists in its laboratories, has gotten in on the act more recently. In his meeting with about two dozen high-tech leaders at the AMD campus, Mr. Karsner pledged his agency's technical expertise in working with the companies to design more efficient data centers. Mr. Karsner suggested cooperation brewing in Silicon Valley could be used as a model to get other industries to cut down on their power use, too.

"We could take this to the forest and paper industry and others," Mr. Karsner says, "and show how to collaborate."

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